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An Evaluation of the  
USDA SPONSORED COTTON PEST MANAGEMENT PROGRAM,  
1972

by

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AN EVALUATION OF THE USDA SPONSORED  
COTTON PEST MANAGEMENT  
PROGRAM, 1972

Introduction

In 1972, cotton pest management projects were established in every major cotton producing state in the United States. It is the purpose of this report to examine the available evidence to determine whether or not these projects have succeeded in improving the economic efficiency of pest control activities and/or improved the quality of the environment. These two criteria are consistent with the USDA's missions of (1) "Environmental Improvement and Resource Development and Use" and (2) "Agricultural Marketing and Production Efficiency." An internal objective of the USDA's pest management program that will also be evaluated in this report is to shift a share of the program costs to the producers themselves and involve the private sector in developing integrated pest management programs. It is hoped that eventually pest management will become adopted by the private agricultural sector without the continuing need for public sponsorship, except for technical advisory and research functions.

Economic efficiency is the relationship between the value of resource inputs and the value of final product. Pest control can be considered a factor input for cotton production. Any alteration of pest control activity that reduces resource input while maintaining output, or increases output for a given input, would be considered an improvement in economic efficiency.

There are several reasons for suspecting that pest control can be made more economically efficient. Crop damage from pests is a comparatively uncertain and therefore risky phenomenon. To compensate for the lack of information on pest infestation it is not uncommon for growers to





apply pesticides as a form of crop insurance. This is evidenced by the practice of spraying on a calendar basis rather than on the basis of an economic threshold of infestation. As a result of intensive pesticide use, there is increasing evidence of pests developing resistance to pesticides and the creation of secondary pest damage due to biological disruption caused by some pesticides. These factors, in conjunction with advances in the biological sciences that focus on the entire ecosystem of a crop, suggest that real efficiency gains are possible.

On the environmental side there is no lack of evidence to support the case that certain chemical pesticides can be pollutants of the natural environment. Over time, this has been partially responsible for more stringent registration and labeling requirements and the banning of some pesticides. Also, Federal and state standards for the re-entry of workers into sprayed fields have been or are being developed.

To evaluate the success of the pest management program, the USDA Pest Management Working Group established an ad hoc Evaluation Committee. As an instrument to collect data on the cotton-pest management program, the Committee developed a questionnaire that was sent to the project leader in each state. The instrument titled "Cotton Project Questionnaire - Evaluation Form - 1972" was sent to project leaders in the later part of 1973. This report is based upon data tabulated from that questionnaire.

Returns from the questionnaire have revealed some shortcomings of the questionnaire itself as well as some serious data limitations. This evaluation is done with explicit recognition of these informational limitations. Slight changes have been made in the questionnaire for collecting data on the program for 1973. Major changes are expected in the data collection instrument for 1974. Because the pest management program was designed as





a three-year effort, great gains were not anticipated during the initial year of operation. Only after data has been collected for the full three years will a thorough evaluation be possible.

#### Program Operation

In 1972 there were 14 million acres of cotton planted in the United States. Of this total, 99.8 percent was grown in the 14 states participating in the cotton pest management program. States not in the program, but which had a combined planted acreage of 27,300, include Virginia, Florida, Illinois, Kentucky, and Nevada. In the 14 participating states, 2,603 producers with 491,600 acres of cotton participated in the pest management program (Table 1 and Table 2). The acreage in the program amounted to 3.5 percent of total planted acreage but within states the range was from a low of 0.6 percent in Georgia to 17.1 percent in Arkansas. The acreage included in the program was confined to one or more regions of each state, and this region is referred to as the project area. In South Carolina, 100 percent of the project area was scouted by the pest management program. In the other states, not all of the project area was scouted. The lowest share was in Missouri where only 4 percent of the project area participated in the program.

Scouting activities in the 14 participating states involved 398 scouts (Table 3). Scouts were, on the average, responsible for monitoring about 1200 acres. Thirty-six individuals functioned as supervisors of the scouts so there was an average of 11 scouts per supervisor (Table 4).

The time sequence of events in monitoring pest infestations was for scouts to make weekly or more frequent pest and beneficial insect counts within cotton fields. This information was immediately given to the growers and then to the professional Extension staff who evaluated the data



and then relayed recommendations on pest control back to the cooperating producers, and/or County Agents or Supervisory Extension Entomologists who assisted the growers in making control decisions. Time is an important factor in this process. The average amount of time elapsed between the actual scouting activity and the making of recommendations to growers was 1 day or less (Table 5).

Cooperating producers generally followed the recommendations of the pest management program professionals with regard to pest control. During this first year, about 71 percent of the producers followed all recommendations (Table 6). However, 16 percent did not follow any recommendations.

The cotton pest management program is being conducted as a cooperative effort with a variety of participants contributing to its operation. The assistance of private consultants, industry representatives, and regulatory agencies has been sought by the Extension Service staff. To measure the extent of contribution from these other sources, project leaders were asked to assign an index number between 0 and 10 to indicate a contribution of from none to an amount equal with that of the Cooperative Extension Service. After Extension, the greatest contribution, particularly in the eastern states, came from the regulatory agencies (Table 7). Private consultants were most involved in Arizona and California. Industry representatives were most important in South Carolina and New Mexico but also provided a substantial effort in Mississippi and Oklahoma.

In carrying out the cotton pest management program, \$1,291,303 was spent in 1972 (Table 8). More than one-half (61 percent) of the total expenditure was for scouts and scout supervisors. To pay for the program expenses, funds were provided by the growers themselves, the USDA, and the states. In aggregate, growers provided \$436,714 or 34 percent of the





total budget in 1972 (Table 9). Eventually, a goal of the cotton pest management program is to have participating producers pay all direct costs of field scouting. During the first year of operation the grower contribution amounted to 54 percent of the cost for scouts and scout supervisors (Table 10). The grower contribution was not an equal share among all states though. North Carolina and Missouri were the states where growers paid the greatest share of scouting costs. In North Carolina, growers paid 83 percent of scouting costs and in Missouri they paid 71 percent. On the other hand, in Louisiana and New Mexico the participating producers did not provide any financial support to the program.

#### Achievements in Economic Efficiency

Of course, if producers are expected to financially support the pest management program, then they will have to realize some gains in economic efficiency as a result of the program. Producers cannot be expected to voluntarily bear the cost of a pest management program unless there is a compensating reduction in pest control expenses or an increase in yield resulting in a net economic gain. The cost per acre for all budgeted expenses of the pest management program averaged \$2.52 but, there is a considerable range between states - from \$1.15 per acre in Arkansas to \$10.77 per acre in California (Table 11). If only the scouting costs are considered, the average cost ranged from \$1.04 per acre in Arkansas to \$5.23 per acre in Tennessee (Table 11).

With an effort to shift total scouting costs to the producers, and with them already paying 55 percent, an initial indicator of the acceptance and value of the program to the producers is their willingness to continue participation in 1973. The reinstatement rate for 1973 averaged 85 percent. In half of the states, over 90 percent of the 1972 cooperators



desired to continue in the program in 1973. Those states where reenlistment was lowest were New Mexico with 58 percent and Texas with 59 percent (Table 12).

To the extent pest management is an economically feasible endeavor, it is anticipated that pest management organizations will be developed, either on a cooperative basis or as private enterprises. In fact, it is a purpose of the pest management program to encourage and assist in the development of pest management organizations because the long term survival of pest management depends upon the establishment of such organizations. In 1972 the actual number of pest management organizations functioning in the project areas of each state was generally between 1 and 5 (Table 13).

Two ways that producers could economically benefit from the pest management program are (1) to realize an increase in crop yield because of improved pest control and (2) to reduce the cost of pest control through a reduction in chemical pesticide use. To know whether the pest management program has contributed to either of these outcomes, it is necessary to make a comparison to the outcome that would have resulted without the pest management program.

A reasonable approach to making the "with and without" comparison is to use a control sample of growers, that are not participating in the pest management program, to represent the without situation. In 1972, only 4 states attempted to make a yield comparison between cooperating producers and a control sample. In all four of these states the crop yield for the cooperating producers was equal to or greater than noncooperators (Table 14). North Carolina and Alabama reported yield increases for cooperators while yields were the same for cooperators and noncooperators in South Carolina.





The cost of materials and application used for chemical pest control ranged from a low of \$1.12 per acre treated for cooperators in Missouri to a high of \$39.87 per acre treated in Georgia (Table 15). This broad range in pest control expenditure reflects the great differences among regions in the type and severity of cotton insect problems. The bollweevil, budworm, and bollworm were the primary target of pesticides applied in 9 of the 14 states and these were, for the most part, the southern and southeastern states (Table 16). The spidermite, lygus bug, pink bollworm, and fleahopper were also important pests in 2 or more states - generally the western states. Whether the pest management program resulted in lower pesticide costs is not possible to determine from the available data since no state provided comparison data on a control group.

Another evaluation technique is to compare the number of pesticide applications to the number of times pest infestations exceeded the economic threshold level. The economic optimum infestation level is the threshold level. A pest infestation exceeding the economic threshold causes more economic loss than the cost of control. On the other hand, an infestation below the threshold level causes less damage than the cost of control.

For all states, there was an average of 5.6 threshold infestations while the number of pesticide applications averaged 6.8. The ratio of pesticide applications to threshold infestation levels was therefore 1.2 to 1.0 (Table 17). Of course, the optimum ratio is 1.0 to 1.0 and it is toward this goal that the pest management program is working. Again, it would be desirable to compare the information on threshold levels of pest infestation with a control group of growers but such data is not available.

Although precise data is not available, project leaders are confident that where insect populations were modest to high, 2-4 early season appli-



cations were saved, and insect scouting delayed initiation of in-season spraying one to three weeks.

### Achievements in Environmental Quality

At the conceptual level, the degree of pollution from chemical pesticides is a function of several variables including: (1) the chemical properties of the pesticide itself, which determines its toxicity and residual life, (2) the geography of the area treated and the accompanying plant and animal life, (3) the total quantity of chemical applied, and (4) the time span over which application is made. Presumably, the pest management program could reduce potential pesticide pollution by altering one or a combination of these variables.

To control the numerous insect pests, a large variety of pesticides were used in 1972. Methyl parathion, toxaphene, and DDT were most frequently used to control cotton pests (Table 18). EPN, azinphos-methyl, and monocrotophos were also used in at least three states. The number of applications per acre treated ranged from one in Missouri to 17 in Mississippi (Table 15). The total quantity of active ingredients applied to each acre treated ranged from one pound in Missouri, Oklahoma, New Mexico, and California to 59 pounds in Mississippi (Table 15).

One aspect of the cotton pest management program that has the potential of reducing pesticide use is the bollweevil diapause control program. It is hoped that effective control of the overwintering insect population will substantially reduce the infestation level the following crop year. Five states report that the diapause control program caused producers to delay the use of or reduce the amount of pesticide on cotton fields (Table 19). These states are North Carolina, Tennessee, Alabama, Arkansas, and





Louisiana. Beltwide, 21 percent of cooperating growers followed a complete diapause control program and 53 percent destroyed the crop after harvest (Table 6).

As part of the cotton pest management program, a pesticide residue sampling study was conducted. The results of this are not yet available, but the study should provide valuable information on the status of pesticides in the environment.

Another aspect of the cotton pest management program that focuses upon the environmental effects of pesticides is the scout safety monitoring program. Because some pesticides can be highly toxic to humans if handled and applied improperly and because knowledge of the effects of pesticide exposure is limited, the blood cholinesterase level of the scouts was measured by approved laboratories in order to detect any lowering that might have resulted from excessive exposure. Only two out of 236 scouts monitored showed a medically significant lowering of the cholinesterase level (Table 20). A record of other scouting accidents, unrelated to pesticide exposure, was also maintained. The occupational hazards of cotton scouting resulted in three accidents: (1) a sprained ankle, (2) a minor auto accident, and (3) a gun shot wound in the leg.

### Conclusions

From the first year's data, it is not possible to draw any firm conclusions about the cotton pest management program's effects upon economic efficiency or environmental quality. The limited information available indicates that in some states positive benefits did result.

Several factors contributed to the lack of evidence in 1972 on the benefits of the program. First of all, and most important, the designers and leaders of the program did not or could not build in a control sample



to serve as a comparison group with the cooperating producers. It is recognized that adequate control samples are difficult to obtain because of the large acreage involved and the diversity of pest and cultural conditions. Secondly, prior to initiation of the program little information was available to document and assess the size and severity of environmental and economic problems related to pest control and pesticide use. Finally, as the initial year of a three year program, 1972 does not serve as an entirely valid indicator for the success of the program.

The real value of this report comes in identifying the data needs for an evaluation. In addition, the necessity of planning for an evaluation prior to initiation of a pest management program becomes highlighted.

The data for 1973 are currently being tabulated and a similar report will be prepared as soon as all questionnaires are received.





Table 1. Cotton acres planted and participation in the cotton pest management program, by state, 1972.

State	Acres <sup>2/</sup> planted	Acres scouted	Percent of cotton acres scouted	
			State	Project Area
	(1,000 acres)	(1,000 acres)	(Percent)	(Percent)
North Carolina	210	7.3	3.5	65
South Carolina	400	16.5	4.1	100
Georgia	461	38.0	8.2	59
Tennessee	540	9.3	1.7	40
Alabama	600	38.8	6.5	78
Mississippi	1,664	16.0	1.0	64
Arkansas	1,470	251.1	17.1	--
Louisiana	690	5.6	0.8	10
Missouri	435	14.9	3.4	4
Oklahoma	553	20.9	3.8	11
Texas	5,605	33.8	0.6	6
New Mexico	160	5.4	3.4	12
Arizona	316	28.0	8.9	27
California	868	5.9	0.7	54
All others <sup>1/</sup>	<u>27</u>	<u>0.0</u>	<u>0.0</u>	
Total	14,000	491.6	3.5	

<sup>1/</sup> Includes Virginia, Florida, Illinois, Kentucky, and Nevada.

<sup>2/</sup> From Agricultural Statistics, USDA, 1973.



Table 2. Producer participation in the cotton pest management program, by state, 1972.

State	Number of producers	Percentage of producers in	
		project area	state
North Carolina	78	65	1.3
South Carolina	131	100	1.2
Georgia	154	22	1.8
Tennessee	40	40	0.2
Alabama	332	53	1.8
Mississippi	109	22	0.4
Arkansas	1,080	--	7.6
Louisiana	70	9	.5
Missouri	107	4	4.0
Oklahoma	117	8	4.0
Texas	184	3	0.1
New Mexico	75	15	1.5
Arizona	105	29	15.0
California	<u>21</u>	28	0.5
Total	2,603		





Table 3. Scouting activities in the cotton pest management program by state, 1972.

State	Scouts in project	Acres scouted	Fields scouted	Acres per scout	Fields per scout
	<u>Number</u>	<u>Acres</u>	<u>Number</u>	<u>Acres</u>	<u>Number</u>
North Carolina	9	7,266	702	807	79
South Carolina	16	16,491	836	1,031	52
Georgia	27	38,000	1,725	1,407	64
Tennessee	28	9,367	1,550	335	55
Alabama	27	38,759	1,481	1,436	55
Mississippi	16	16,000	1,086	1,000	68
Arkansas	184	251,100	6,943	1,365	38
Louisiana	6	5,600	230	933	38
Missouri	9	14,900	414	1,655	46
Oklahoma	16	20,900	594	1,306	37
Texas	20	33,839	861	1,692	43
New Mexico	6	5,436	300	906	50
Arizona	28	28,000	900	1,000	32
California	<u>6</u>	<u>5,917</u>	<u>121</u>	<u>986</u>	<u>20</u>
Total	398	491,575	17,743	1,235	45



Table 4. Scout supervisors in the cotton pest management program, by state, 1972.

State	Scout supervisors	Scouts per supervisor	Acres per supervisor	Fields per supervisor
	<u>Number</u>	<u>Number</u>	<u>Acres</u>	<u>Number</u>
North Carolina	2	4.5	3,633	351
South Carolina	3	5.3	5,497	279
Georgia	3	9.0	12,667	575
Tennessee	4	7.0	1,338	388
Alabama	5	5.4	7,752	296
Mississippi	1	16.0	16,000	1,086
Arkansas	3	61.3	83,700	2,314
Louisiana	2	3.0	2,800	115
Missouri	1	9.0	14,900	414
Oklahoma	3	5.3	6,967	198
Texas	2	10.0	16,920	430
New Mexico	1	6.0	5,436	300
Arizona	4	7.0	7,000	225
California	<u>2</u>	<u>3.0</u>	<u>2,958</u>	<u>60</u>
Total	36	11.1	13,655	493



Table 5. Elapsed time between scouting and recommendations to producers in the cotton pest management program, by state, 1972.

State	Elapsed time
	(days)
North Carolina	0
South Carolina	0.5
Georgia	1.0
Tennessee	1.0
Alabama	0
Mississippi	1.5
Arkansas	0
Louisiana	1.5
Missouri	1.0
Oklahoma	1.0
Texas	1.5
New Mexico	2.0
Arizona	0.5
California	1.0





Table 6. Degree to which cooperating producers in the cotton pest management program followed pest control recommendations, by state, 1972.

State	Number of cooperating producers	Percentage of Cooperating Producers Who:					
		Followed all recommendations	Followed no recommendations	Destroyed crop after harvest	Followed complete diapause program	Used trap-crop program	Used other control practice
	(number)	----- (percentage) -----					
N.C.	78	100	0	-	1	0	0
S.C.	131	38	19	77	0	-	76
Ga.	154	60	10	78	32	-	0
Tenn.	40	75	25	88	25	0	-
Ala.	332	98	2	75	89	0	0
Miss.	109	73	0	0	0	0	2
Ark.	1,080	88	12	46	83	-	-
La.	70	30	34	43	57	0	0
Mo.	107	95	3	84	0	0	0
Okla.	117	68	10	86	0	0	0
Tex.	184	29	29	100	14	-	-
N.M.	75	53	47	1	-	-	5
Ariz.	105	54	46	1	-	-	8
Cal.	21	95	5	1	-	-	0
Average		71	16	53	24	0	9



Table 7. Contribution from private consultants, industry representatives and regulatory agencies to the cotton pest management program, by state, 1972.

State	Private consultants	Industry representatives	Regulatory agencies
----- (index <u>1</u> /) -----			
North Carolina	0	1	5
South Carolina	0	6	8
Georgia	0	2	5
Tennessee	0	1	8
Alabama	0	0	2
Mississippi	1	3	6
Arkansas	2	1	0
Louisiana	0	0	5
Missouri	0	1	1
Oklahoma	0	3	2
Texas	1	2	4
New Mexico	0	5	0
Arizona	6	1	2
California	8	0	0

1/ The index is a rating from 0 to 10 for none to an amount equal with that of the Cooperative Extension Service.





Table 8. Expenditure distribution for the cotton pest management program, by state, 1972.

State	Total		Professional support		Scout supervisors		Scouts		Clerical		Computer		Supplies	
	Dol.	Pct.	Dol.	Pct.	Dol.	Pct.	Dol.	Pct.	Dol.	Pct.	Dol.	Pct.	Dol.	Pct.
N. Carolina	39,845	100	9,500	24	8,250	21	16,925	42	2,145	5	1,200	3	1,825	5
S. Carolina	53,312	100	6,910	13	7,054	13	27,580	52	2,496	5	1,110	2	8,162	15
Georgia	80,137	100	7,400	9	7,902	10	58,544	73	2,500	3	0	0	3,791	5
Tennessee	61,333	100	9,000	15	11,000	18	36,000	62	0	0	3,333	5	0	0
Alabama	126,712	100	53,713	42	22,908	18	38,759	31	6,411	5	3,718	3	1,203	1
Mississippi	121,134	100	76,233	63	4,041	3	26,350	22	7,199	6	3,442	3	3,869	3
Arkansas	287,880	100	17,033	6	10,442	4	250,000	87	473	0	9,645	3	287	0
Louisiana	43,344	100	17,000	39	9,412	22	13,265	31	2,033	5	417	1	1,217	3
Missouri	26,071	100	2,935	11	5,664	22	14,047	54	2,295	9	500	2	630	2
Oklahoma	115,739	100	48,106	33	13,850	12	33,275	29	16,969	15	0	0	3,535	3
Texas	108,834	100	20,551	19	47,729	44	29,821	27	3,605	3	4,000	4	3,128	3
New Mexico	25,000	100	5,000	20	5,350	21	9,650	39	1,568	6	2,300	9	1,132	5
Arizona	138,250	100	55,000	40	24,750	18	40,203	29	5,400	4	7,200	5	5,700	4
California	63,716	100	30,750	48	29,395	46	---	---	606	1	1,356	2	1,609	3
Total	1,291,303	100	359,131	26	207,747	16	536,016	45	53,700	4	38,221	3	36,088	3



Table 9. Sources of funds for the cotton pest management program, by state, 1972.

State	Total		USDA		State		Grower	
	(Dol.)	(Pct.)	(Dol.)	(Pct.)	(Dol.)	(Pct.)	(Dol.)	(Pct.)
North Carolina	39,845	100	18,885	47	0	0	20,960	53
South Carolina	53,312	100	34,162	62	14,500	27	4,650	11
Georgia	80,137	100	54,003	68	5,000	6	21,134	26
Tennessee	61,333	100	28,333	46	9,000	15	24,000	39
Alabama	126,712	100	26,123	21	64,044	50	36,545	29
Mississippi	121,134	100	76,664	63	24,470	20	20,000	17
Arkansas	287,800	100	25,730	9	12,150	4	250,000	87
Louisiana	43,344	100	43,344	100	0	0	0	0
Missouri	26,071	100	5,769	22	5,730	22	14,572	56
Oklahoma	115,735	100	48,921	42	61,181	53	5,633	5
Texas	108,834	100	70,718	65	23,855	22	14,262	13
New Mexico	25,000	100	20,000	80	5,000	20	0	0
Arizona	138,250	100	95,050	68	30,000	22	13,200	10
California	<u>63,716</u>	<u>100</u>	<u>20,310</u>	<u>32</u>	<u>31,648</u>	<u>50</u>	<u>11,758</u>	<u>18</u>
Total	1,291,303	100	568,012	44	286,578	22	436,714	34

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Table 10. Participating producer contributions to the cotton pest management program, by state, 1972.

State	Producer contribution per acre	Producer contribution as percent of scouting costs <sup>1/</sup>
	(dollars)	(percent)
North Carolina	2.88	83
South Carolina	.28	13
Georgia	.56	32
Tennessee	2.56	49
Alabama	.94	60
Mississippi	1.25	66
Arkansas	1.00	96
Louisiana	0	0
Missouri	.98	74
Oklahoma	.27	12
Texas	.42	18
New Mexico	0	0
Arizona	.47	20
California	<u>1.99</u>	<u>40</u>
Total	.89	54

<sup>1/</sup> Scouting costs include the salary and expenses for scouts plus the salary and expenses for scout supervisors.





Table 11. Cotton pest management program costs per acre scouted, by state, 1972.

State	All program costs	Scouting costs <u>1/</u>
	(dollars)	(dollars)
North Carolina	5.48	3.46
South Carolina	3.23	2.10
Georgia	2.11	1.75
Tennessee	6.55	5.23
Alabama	3.27	1.59
Mississippi	7.57	1.90
Arkansas	1.15	1.04
Louisiana	7.74	4.05
Missouri	1.75	1.32
Oklahoma	5.54	2.25
Texas	3.22	2.29
New Mexico	4.60	2.76
Arizona	4.94	2.32
California	<u>10.77</u>	<u>4.97</u>
All states	2.63	1.64

1/ Scouting costs include the salary and expenses for scouts plus the salary and expenses for scout supervisors.



Table 12. Producer reinstatement for 1973 in the cotton pest management program, by state, 1972.

State	Percent of 1972 producers who agreed to participate in 1973
North Carolina	95
South Carolina	100
Georgia	92
Tennessee	96
Alabama	100
Mississippi	70
Arkansas	95
Louisiana	85
Missouri	81
Oklahoma	84
Texas	59
New Mexico	58
Arizona	83
California	95
Average	85





Table 13. Pest management organizations in the project areas of the cotton pest management program, by state, 1972.

State	Number of pest management organizations
North Carolina	2
South Carolina	1
Georgia	4
Tennessee	5
Alabama	2
Mississippi	1
Arkansas	94
Louisiana	0
Missouri	1
Oklahoma	4
Texas	5
New Mexico	2
Arizona	2
California	2



Table 14. Cotton yield for growers in the cotton pest management program and a control sample of growers, by state, 1972.

State	Average yield per acre	
	Cooperators	Control
	(pounds)	(pounds)
North Carolina	545	425
South Carolina	662	662
Georgia	587	--
Tennessee	--	--
Alabama	607	470
Mississippi	--	--
Arkansas	500	--
Louisiana	665	--
Missouri	498	--
Oklahoma	470	--
Texas	444	408
New Mexico	--	--
Arizona	1,069	--
California	1,050	--

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2 Table 15. Pesticide application rate and cost for participating producers in the cotton pest management program, by state, 1972.

State	Scouted acres treated with pesticides (percent)	Average applications per acre treated (number)	Quantity of pesticide applied per acre treated (pounds)		Cost of materials and application per acre treated (all applications) (dollars)
			Per application	Total	
North Carolina	100	10.8	2.2	24	22.40
South Carolina	100	15.0	3.5	52	37.50
Georgia	100	15.5	3.0	47	39.87
Tennessee	90	10.0	3.8	38	6.94
Alabama	100	11.2	1.5	17	33.84
Mississippi	100	17.0	3.5	59	26.80
Arkansas	87	4.5	2.0	9	9.85
Louisiana	95	13.6	2.9	39	20.30
Missouri	61	1.0	1.0	1	1.12
Oklahoma	56	5.8	0.2	1	15.70
Texas	97	6.4	2.8	18	15.56
New Mexico	2	2.9	0.3	1	11.00
Arizona	99	8.7	0.7	6	12.25
California	60	2.0	0.5	1	8.57





Pest	State													
	N.C.	S.C.	Ga.	Tenn.	Ala.	Miss.	Ark.	La.	Mo.	Okla.	Tex.	N.M.	Ariz.	Cal.
Bollweevil	x	x	x	x	x	x	x	x	x	x	x			
Budworm	x	x	x	x	x	x		x		x	x			
Bollworm		x		x	x	x	x		x		x	x		
Spidermite	x		x		x									x
Lygus												x	x	x
Pink Bollworm											x		x	
Fleahopper										x	x			
Cutworm						x								
Thrips									x					
Plant Bugs						x								
Pest Complex												x	x	x



Table 17. Number of economic threshold infestations and pesticide applications for participating producers in the cotton pest management program, by state, 1972

State	Economic threshold pest infestations	Pesticide applications	Applications per threshold
	(number)	(number)	(number)
North Carolina	5.0	11.0	2.2
South Carolina	12.0	15.0	1.2
Georgia	16.0	15.5	1.0
Tennessee	3.0	4.0	1.3
Alabama	14.0	11.2	0.8
Mississippi	8.0	10.6	1.3
Arkansas	3.0	4.0	1.3
Louisiana	1.1	10.0	9.1
Missouri	0.6	0.6	1.0
Oklahoma	7.0	8.0	1.1
Texas	3.6	6.4	1.8
New Mexico	?	?	?
Arizona	4.0	8.7	2.2
California	?	?	?
Average	5.6	6.8	1.2



Pesticide	State													
	N.C.	S.C.	Ga.	Tenn.	Ala.	Miss.	Ark.	La.	Mo.	Okla.	Tex.	N.M.	Ariz.	Cal.
Methyl parathion	x	%	x	x	x	x	x	x	x	x	x	x	x	
Toxaphene	x	%	x	x	x	x	x	x	x	x	x	x		
DDT	x	x	x		x			x			x			
EPN				x		x	x				x			
Azinphos-methyl					x	x	x				x			
Monocrotophos			x								x			
Trichlorfon											x			
Dicrotophos									x		x			
Ethyl parathion													x	
Thimet														x
Dieofol														x
Comite														x
Malathion														x
Dimetoate											x			
Chlorphenamidine											x			
Sodium chlorate											x			
DEF											x			
Endrin											x			
Folex											x			
Aldicarb											x			





Table 19. Effect of diapause control on pesticide use for participating producers in the cotton pest management program, by state, 1972.

State	Producers delaying or using less pesticides due to the diapause program
	(percent)
North Carolina	75
South Carolina	--
Georgia	--
Tennessee	20
Alabama	60
Mississippi	--
Arkansas	75
Louisiana	50
Missouri	0
Oklahoma	0
Texas	--
New Mexico	--
Arizona	--
California	--



Table 20. Measures of scout safety in the cotton pest management program,  
by state, 1972.

State	Scouts sampled for cholinesterase	Scouts having pre-exposure blood studies	Scouts showing lowering of cholinesterase	Pesticide accidents
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
North Carolina	9	9	1	0
South Carolina	16	16	0	0
Georgia	27	27	0	0
Tennessee	31	31	0	0
Alabama	26	26	0	0
Mississippi	14	14	0	0
Arkansas	25	25	0	0
Louisiana	8	8	0	0
Missouri	0	0	0	0
Oklahoma	21	19	0	0
Texas	18	13	1	0
New Mexico	8	8	0	0
Arizona	28	28	0	0
California	<u>5</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	236	224	2	0

